

CLAIMS

1. A chemical-amplification type silicone-based positive-working resist composition characterized in that, in a chemical-amplification type positive-working resist composition containing (A) an alkali-soluble resin and (B) a photoacid-generating agent, a ladder-type silicone copolymer containing (a₁) (hydroxyphenylalkyl)sil-sesquioxane units, (a₂) (alkoxyphenylalkyl)sil-sesquioxane units and (a₃) alkyl- or phenylsil-sesquioxane units is used as the (A) alkali-soluble resin.
2. The chemical-amplification type silicone-based positive-working resist composition described in Claim 1 in which the component (A) is a ladder-type silicone copolymer consisting of 10-70% by moles of the units (a₁), 5-50% by moles of the units (a₂) and 10-60% by moles of the units (a₃).
3. The chemical-amplification type silicone-based positive-working resist composition described in Claim 1 or 2 in which the proportion of the units (a₂) is so adjusted that the dissolving rate in alkali be from 0.05 to 50 nm/s.
4. The chemical-amplification type silicone-based positive-working resist composition described in Claim 1, 2 or 3 in which the component (B) is an onium salt or a diazomethane compound.
5. The chemical-amplification type silicone-based positive-working resist composition described in either one of Claims 1 to 4 in which, in addition to the component (A) and component (B), a phenolic compound of which the phenolic hydroxyl group is protected by an acid-dissociable group or a carboxylic compound of which the carboxylic group is protected by an acid-dissociable group is compounded as a dissolution inhibitor (C), in a proportion of 0.5-40 parts by mass per 100 parts by mass of the component (A).
6. The chemical-amplification type silicone-based positive-working resist composition described in either one of Claims 1 to 5 in which, in addition to the component (A) and component (B) or the component (A), component (B) and component (C), an amine and/or an organic acid are/is compounded as a quencher (D) in a proportion of 0.01-5 parts by mass per 100 parts by mass of the component (A).

7. A bilayered resist material characterized in that an organic layer is provided on a substrate and a layer of the chemical-amplification type silicone-based positive-working resist composition described in either one of Claims 1 to 6 is formed thereon.
8. The bilayered resist material described in Claim 7 in which the organic layer is a layer of a novolak resin or a layer of a novolak resin containing a 1,2-naphthoquinonediazido group.
9. The bilayered resist material described in Claim 7 or 8 in which the organic layer has a thickness of 200-800 nm and the layer of the chemical-amplification type silicone-based positive-working resist composition has a thickness of 50-200 nm.
10. A ladder-type silicone copolymer which contains (hydroxyphenylalkyl)silsesquioxane units, (alkoxyphenylalkyl)silsesquioxane units and phenylsilsesquioxane units.
11. The ladder-type silicone copolymer described in Claim 10 which consists of 10-70% by moles of the (hydroxyphenylalkyl)silsesquioxane units, 5-50% by moles of the (alkoxyphenylalkyl)silsesquioxane units and 10-60% by moles of the phenylsilsesquioxane units.
12. The ladder-type silicone copolymer described in Claim 10 or 11 of which the dissolving rate in alkali is in the range of 0.05-50 nm/s.
13. The ladder-type silicone copolymer described in Claim 10 of which the mass-average molecular weight is in the range of 1500-30000.
14. The ladder-type silicone copolymer described in Claim 10 of which the molecular weight dispersion is in the range of 1.0-5.0.
15. A method of forming a patterned resist film on a substrate which comprises a step of selectively exposing the bilayered resist material described in either one of Claims 7 to 9 to actinic rays, and a step of dissolving away the portion of the resist film solubilized by the light-exposure with an aqueous alkali solution.